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(54) POLYOLEFIN-BASED FIBER PAPER AND ITS PRODUCTION

(57)Abstract:
PURPOSE: To obtain the subject fiber paper having sufficient liquid retaining property, being dense, thin-wall and strong and usable as a separator for secondary cells.
CONSTITUTION: This polyolefin-based fiber paper contains ≥40wt.% of a hydrophilic polyolefin (PO) fiber using e.g. sulfoated polypropylene fiber and an ester-ethylene copolymer fiber as hydrophilic [PO]-based fibers and using an ester-ethylene copolymer conjugate fiber as a hydrophilic PO-based binder fiber and has 1-100g/m2 weight and 0.2-0.5g/cm3 density.

LEGAL STATUS

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention is excellent in electrolytic-solution retentivity, and relates to the cell which used the nonwoven fabric for battery separators and it which can prevent an internal short circuit.
[0002]
[Description of the Prior Art] It is 10 micrometers of diameters of average fiber and thickness 100 it is thin from polypropylene in order to prevent an internal short circuit as separator for lithium ion polymer batteries and to make the electrolytic solution hold conventionally. Although what carried out the immersing postcure of the solid polymer electrolyte to the nonwoven fabric before and behind mum was used, since separator thickness was thick, ionic conduction fell, the high-rate-discharge performance was bad and there was a problem that a volume energy density was small.
[0003]
[Problem(s) to be Solved by the Invention] this invention relates to the cell which used the nonwoven fabric for separator and it which can be excellent in electrolytic-solution retentivity, and can prevent an internal short circuit as a nonwoven fabric for separator for lithium ion polymer batteries, and can improve a high-rate-discharge performance just like a liquid system lithium ion battery.
[0004]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, it consists of organic fiber whose diameter of fiber is 1-5 micrometers, and thickness is 10-35 micrometers and the nonwoven fabric for battery separators characterized by the amount of superintendent officers of organic fiber being 1 - 15 g/m2 is used.
[0005] Moreover, the above-mentioned organic fiber is characterized by being a polypropylene fiber, a polyethylene terephthalate fiber, polypropylene terephthalate fiber, polybutylene-terephthalate fiber, polyphenylene ape fight fiber, and polyethylenenaphthalate fiber.
[0006]
[Embodiments of the Invention] The thickness of the nonwoven fabric for battery separators is 10-35 micrometers, and is 20 micrometers or less preferably, and the diameter of fiber of this invention is 1-5 micrometers. preferably It consists of organic fiber which is 3 micrometers or less. organic fiber A polypropylene fiber, For a polyethylene terephthalate fiber, a polyethylene terephthalate fiber, polybutylene-terephthalate fiber, polyphenylene ape fight fiber, and polyethylenenaphthalate fiber The amount of superintendent officers of organic fiber is 1 - 15 g/m2, and what sank in and hardened the solid polymer electrolyte or the gel electrolyte preferably to the nonwoven fabric for battery separators which is 5 - 8 g/m2 is used for a lithium ion polymer battery.
[0007] If the diameter of fiber of the above-mentioned nonwoven fabric exceeds 5 micrometers, the crevice between separator will increase and it will become the cause of a short circuit, and if the diameter of fiber is less than 1 micrometer, the intensity of separator will fall. moreover -- if less [if the thickness of the above-mentioned nonwoven fabric exceeds 35 micrometers, the interval (very between) of a positive electrode and a negative electrode will increase, and the high-rate-discharge performance and energy density of a cell will fall, and] than 10 micrometers -- very between -- narrow -- becoming -- passing -- simplistic -- it becomes a cause Furthermore, if the amount of superintendent officers of the organic fiber of the above-mentioned nonwoven fabric exceeds 15 g/m2, the electrolytic-solution retentivity ability of separator will fall, and if the amount of superintendent officers is less than 1g/m2, the crevice between separator will increase and it will become the cause of a short circuit.
[0008]
[Example] Hereafter, one example of this invention is explained based on a drawing. In addition, the material and the configuration of this invention are not limited to the example shown below. Moreover, it is not limited to the example shown below also about the hardening method.
[0009] Drawing 1 is 0.2CmA(s) which show one example of this invention, and 1CmA. It is an electric discharge property. Drawing 2 is 0.2CmA(s) which show the example of comparison, and 1CmA. It is an electric discharge property.
[0010] (This invention) Diameter 3 of average fiber which consists of polypropylene It is a polyethylene oxide (PEO) to the nonwoven fabric which adjusted the fiber of mum to 22 micrometers in the amount of superintendent officers of 6g/m2, and thickness. A solid electrolyte and 6 fluoride [phosphoric-acid] lithium (LiPF6) It sank in, the mixture of the electrolytic solution which consists of a propylene carbonate (PC) solution was hardened with a heat press, and separator was produced.
[0011] A positive electrode is a polyethylene oxide (PEO) to the mixture which becomes one side of the charge collector which consists of a rectangular aluminum foil from the active material powder, electric conduction material, such as acetylene black, and

binding material of a cobalt acid lithium (LiCoO2). It sank in, and the mixture of the electrolytic solution which serves as a solid electrolyte from the propylene carbonate (PC) solution of 6 fluoride [phosphoric-acid] lithium (LiPF6) was hardened with a heat press, and was used as the positive-electrode board.
[0012] A negative electrode is the end of a carbon powder, and a polyethylene oxide (PEO) to one side of the charge collector which consists of rectangular copper foil. A solid electrolyte and 6 fluoride [phosphoric-acid] lithium (LiPF6) Copper foil is made to bind the mixture which consists of mixture of the electrolytic solution which consists of a propylene carbonate (PC) solution, and it consists of what was hardened with a heat press like the positive electrode.
[0013] Thus, the electrode group of a lithium ion polymer battery completes the becoming separator by lamination ****** in respect of the active material of a positive electrode and a negative electrode. A lithium ion polymer battery is completed by wrapping this electrode group in an aluminum lamination sheet. the size of a completion cell -- 54x75x0.5mm it is -- capacity -- 40mAh(s) it is . 1CmA of this cell The electric discharge performance was about 80% of a 0.2CmA electric discharge performance. Moreover, as for the cell which carried out the internal short circuit, one cell was not accepted among 10 cells, either.
[0014] (Example of comparison) They are amount of superintendent officers 25 g/m2, and thickness 100 about the fiber of 10 micrometers of diameters of average fiber which consists of polypropylene. To the nonwoven fabric adjusted to mum, it is a polyethylene oxide (PEO). A solid electrolyte and 6 fluoride [phosphoric-acid] lithium (LiPF6) It sank in, the mixture of the electrolytic solution which consists of a propylene carbonate (PC) solution was hardened with a heat press, and separator was produced.
[0015] A positive electrode is a polyethylene oxide (PEO) to the mixture which becomes one side of the charge collector which consists of a rectangular aluminum foil from the active material powder, electric conduction material, such as acetylene black, and binding material of a cobalt acid lithium (LiCoO2). It sank in, and the mixture of the electrolytic solution which serves as a solid electrolyte from the propylene carbonate (PC) solution of 6 fluoride [phosphoric-acid] lithium (LiPF6) was hardened with a heat press, and was used as the positive-electrode board.
[0016] A negative electrode is the end of a carbon powder, and a polyethylene oxide (PEO) to one side of the charge collector which consists of rectangular copper foil. A solid electrolyte and 6 fluoride [phosphoric-acid] lithium (LiPF6) Copper foil is made to bind the mixture which consists of mixture of the electrolytic solution which consists of a propylene carbonate (PC) solution, and it consists of what was hardened with a heat press like the positive electrode.
[0017] Thus, the electrode group of a lithium ion polymer battery completes the becoming separator by lamination ****** in respect of the active material of a positive electrode and a negative electrode. A lithium ion polymer battery is completed by wrapping this electrode group in an aluminum lamination sheet. the size of a completion cell -- 54x75x0.57mm -- it is -- capacity -- 40mAh(s) it is . 1CmA of this cell Electric discharge performances were 0.2CmA(s) and about 50% of an electric discharge performance. Moreover, as for the cell which carried out the internal short circuit, one cell was not accepted among 10 cells, either.
[0018]
[Effect of the Invention] As explained in full detail above, this invention does so the effect indicated below.
[0019] Although thickness is about 20 micrometers, the separator nonwoven fabric for lithium ion polymer batteries of this invention is excellent in short circuit-proof nature and an electrolytic-solution maintenance property, and excellent in a high-rate-discharge property also in the cell using the solid electrolyte.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] 0.2CmA(s) and 1CmA concerning this invention It is an electric discharge property view.
[Drawing 2] Conventional 0.2CmA(s) and conventional 1CmA It is an electric discharge property view.

[Translation done.]

* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The nonwoven fabric for battery separators characterized by consisting of organic fiber whose diameter of fiber is 1-5 micrometers, for thickness being 10-35 micrometers, and the amount of superintendent officers of organic fiber being 1 - 15 g/m2.
[Claim 2] The nonwoven fabric for battery separators according to claim 1 to which the above-mentioned organic fiber is characterized by being a polypropylene fiber, a polyethylene terephthalate fiber, polypropylene terephthalate fiber, polybutylene-terephthalate fiber, polyphenylene ape fight fiber, and polyethylenenaphthalate fiber.
[Claim 3] The cell which used the nonwoven fabric according to claim 1 or 2 as separator.

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